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M 431.01: Abstract Algebra I

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M 431 Abstract Algebra I
Fall 2021, MTWF 1:00-1:50, Math 311 (or by zoom)

Course Information

- **Instructor:** Kelly McKinnie, Math 111, 243-5694, kelly.mckinnie@umontana.edu
- **Textbook:** Abstract Algebra, Theory and Applications by Thomas W. Judson. Open source book. Available at <https://books.aimath.org/aata/>. Login with your ID and PSSWD discussed below. I am hoping to cover most of Chapters 1 -- 11, 16 – 18, 20, 21. Specific sections will be listed on the Moodle course page as the semester progresses.
- **Prerequisites:** M 221 (Linear Algebra) and M307 (Intro to Abstract Math)
- **Software:** Some assignments will require the use of SageMath in Jupyter notebooks. SageMath (sagemath.org) is a free, opensource, software system for advanced mathematics with which we can study abstract algebra. All students participating in the UTMOST study (see below) will receive a free semester upgrade to this class's SageMath project hosted on the subscription service cocalc.com. All exercises for this class can also be done using the free cocalc account option, but the service will run slower (and contain an annoying red banner). Sign up using your @umconnect.umd.edu address.
- **Office Hours:** See my office hours link which can be found at <http://www.umd.edu/people/mckinnie>
- **Zoom link is listed on Moodle page.** Used for all class meetings and office hours.

Catalog description

Offered autumn. An introduction to modern ideas of algebra through the study of groups, rings, and fields. Level: Undergraduate-Graduate

Learning Outcomes:

Upon completion of this course, a student will be able to:

1. Explain the basics of group and ring theory;
2. Explain the important definitions and to be able to use them correctly;
3. Demonstrate proficiency at simple verification proofs,
4. Demonstrate improved proficiency in constructing proofs (focusing on correctness and clarity),
5. Use proper English in written assignments.

Important dates:

Dates	Topic
various	See https://www.umd.edu/registrar/calendar/autumn-2021.php for all registration deadlines (add, drop, grade change, etc.)
Sept 6	Labor Day – no class
Nov 11	Veterans Day – no class
Dec 10	Last regular class day and last day to petition to drop/add and change to CR/NCR.
Dec 15	Final exam (required) Wednesday December 15, 1:10 – 3:10 pm in Math 311.

Course Requirements & Grading (+/- grading will be used):

- **Attendance:** 5% (in-person or by zoom, must be live)
- **Problem Sets:** 45% (Reading Questions 5%, weekly homework 40%)
- **Midterm Exams 1,2:** 30%. *Tentative* dates are Tues, Oct. 12 and Dec 3. Makeups are given at instructor's discretion and only in cases of emergency or other important

circumstances. If you cannot make it to an exam, you must let me know BEFORE the exam is given.

- **Final Exam (comprehensive):** 20%.
- **Complete 2 non-graded assessments;** beginning of semester assessment 2nd class day and end of semester assessment, date TBD.

Course guidelines and policies:

Incompletes

Incompletes are given at the discretion of the instructor. They are only considered in cases where the student has been in attendance and doing passing work up to three weeks before the time of request. The request must be made based on circumstances beyond the student's control causing the student undo hardship in completing the requirements of the course on time. Negligence and indifference are not acceptable reasons.

Classroom and Course-related Behavior

University policy requires that all of us in the classroom treat each other with respect, and refrain from behavior that will disrupt the educational process. Please refrain from using any electronics during class that are not directly related to what we are doing. If you would prefer to be called by a different name, or gender pronoun, then that listed on the course roster, please let me know.

Student Conduct Code

All students need to be familiar with the Student Conduct Code. You can find it [online](#). Discrimination and harassment are not tolerated at the University of Montana. If you feel that you have been subjected to discriminatory or harassing behavior, please contact the Office of Equal Opportunity and Affirmative Action at 243-5710 or visit [this link](#) for help in addressing the situation. You can also report the discrimination or harassment to me or to another faculty member you trust.

Academic Honesty

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University.

Disability modifications

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and the Office for Disability Equity (ODE). If you anticipate or experience barriers based on disability, please contact the ODE at: (406) 243-2243, ode@umontana.edu, or visit [the ODE webpage](#) for more information. Retroactive accommodation requests will not be honored, so please, do not delay. As your instructor, I will work with you and the ODE to implement an effective accommodation, and you are welcome to contact me privately if you wish.

Homework

Homework will be due at 5pm of the listed due date. All assignments will be either uploaded via Moodle, turned in via cocalc.com or completed through UTMOST (logs). Completion of all logs counts as one HW assignment. If students complete all logs (get 100% on log assignment) I will also drop your lowest HW score.

You are allowed and even encouraged to work with others on the homework as long as ***the solutions you present are your own***. Plagiarism will not be tolerated. This includes copying from another student and from internet sources. That being said, work together! Come up with the ideas behind the solutions as a group, then write up your own solution. Avoid reading others solutions before writing up your own. Problems will be graded based on two considerations:

- Logical correctness.

- Ease of readability. (This is of utmost importance in our class. I think of this class as one where you refine the proof reasoning and writing skills you gained in M307 Abstract Math). Technically correct but hard to read/understand/follow proofs will not receive full points.

Homework assignments will oftentimes include SageMath exercises which are to be completed using cocalc.com.

UTMOST

During Fall 2021 I will be participating in the [UTMOST](#) project. UTMOST is studying how instructors and students use open source software and textbooks. Both our book and SageMath are open resources. As one homework assignment I will ask you to complete a series of “logs” asking you how you are learning in this class. As part of the project I will give you a letter inviting you to join the UTMOST project as a participant. There are no additional class requirements for study participants. Those who do not wish to participate in the study will complete all class logs and assessments as assigned but will not have the UTMOST linked assessments included in the UTMOST analysis of our course. Students will be assigned a unique ID which allows UTMOST to follow your assessments while never being told any identifying information about you (I never give them your names, just a list of numbers).

All students, regardless of participation in the UTMOST project will receive student IDs for the class. These will be used for logging into the html version of the book and submitting logs (whether analyzed or not).

Grade Scale

Cutoff Percentage:	93%	90%	87%	83%	80%	75%	70%	65%	62%	58%	55%
Grade:	A	A-	B+	B	B-	C+	C	C-	D+	D	D-

Graduate Increment

Students taking M431 with the graduate increment will have enhanced homework assignments and will take different Exams (I, II and final).

COVID Mitigation Measures

- Mask use is required within the classroom.
- If you feel sick and/or are exhibiting COVID-19 symptoms, please don't come to class and contact the Curry Health Center at (406) 243-4330.
- If you are required to isolate or quarantine, you will receive support in the class to ensure continued academic progress. In this case the attendance requirement will be waived for the duration of the isolation/quarantine and all lectures will be recorded and available on the Moodle page.
- UM recommends students get the COVID-19 vaccine. Please direct your questions or concerns about vaccines to Curry Health Center.
- Classroom windows will be open whenever possible. Bring a sweater if needed.
- Class attendance and seating will be recorded to support contact tracing efforts. Please consistently sit in the same seat.
- Drinking liquids and eating food is discouraged within the classroom.
- Please note this class is being recorded. Notifying students is a requirement.